

4/24/09 Honors

**Multiple Choice***Identify the choice that best completes the statement or answers the question.***Solve the equation.**D

1.  $3|4x + 3| - 7 = 20$

a.  $x = 2$  or  $x = -1\frac{1}{3}$

c.  $x = 2$  or  $x = -3$

b.  $x = 2$  or  $x = 1\frac{1}{2}$

d.  $x = 1\frac{1}{2}$  or  $x = -3$

B

2. through  $(-6, -6)$  and perpendicular to  $y = \frac{1}{4}x + 1$ .

a.  $y = -\frac{1}{4}x - \frac{15}{2}$

b.  $y = -4x - 30$

c.  $y = 4x + 18$

d.  $y = \frac{1}{4}x - \frac{9}{2}$

**Graph the inequality.**D

3.  $2x - 4y < -3$

a. —

c. —

b. —

d. —

**Foil**A

4.  $f(x) = (3x - 5)(2x + 6)$

a.  $6x^2 - 8x - 30$

c.  $6x^2 - 30$

b.  $-15x^2 + -3x - 30$

d.  $8x - 30$

D

5. Solve by factoring.

$4x^2 - 21x - 18 = 0$

a.  $-6, \frac{2}{3}$

b.  $6, 4$

c.  $-\frac{3}{4}, \frac{2}{3}$

d.  $6, -\frac{3}{4}$

B

6. Find the missing value to complete the square.

$x^2 + 12x + \underline{\hspace{1cm}}$

a. 1,296

b. 36

c. 12

d. 144

**Rewrite the equation in vertex form.**C

7.  $y = x^2 + 10x + 17$

a.  $y = (x + 10)^2 - 8$

c.  $y = (x + 5)^2 - 8$

b.  $y = (x + 10)^2 + 12$

d.  $y = (x + 5)^2 + 42$

**Solve the equation.**D

8.  $-4x^2 + 3x + 8 = 0$

a.  $\frac{3}{4} \pm \frac{\sqrt{137}}{4}$

c.  $\frac{8}{3} \pm \frac{\sqrt{274}}{8}$

b.  $\frac{3}{8} \pm \frac{\sqrt{68}}{2}$

d.  $\frac{3}{8} \pm \frac{\sqrt{137}}{8}$

**Simplify the expression.**C

9.  $(4)^{-2}$

a.  $-\frac{1}{16}$

b.  $-8$

c.  $\frac{1}{16}$

d.  $16$

A

10. Find the zeros of  $y = x(x + 2)(x + 5)$ .

a.  $0, -2, -5$

c.  $-2, -5$

b.  $0, 2, 5$

d.  $-2, -5, 2$

D

11. Write a polynomial function in standard form with zeros at  $-5$ ,  $-4$ , and  $-1$ .

a.  $f(x) = x^3 + 20x^2 + 10x + 29$

c.  $f(x) = x^3 + 10x^2 + 29x + 9$

b.  $f(x) = x^3 + 21x^2 + 100x + 9$

d.  $f(x) = x^3 + 10x^2 + 29x + 20$

D

12. An initial population of 340 quail increases at an annual rate of 20%. Write an exponential function to model the quail population.

a.  $f(x) = (340 \cdot 0.2)^x$

c.  $f(x) = 340(20)^x$

b.  $f(x) = 340(0.2)^x$

d.  $f(x) = 340(1.2)^x$

B

13. Suppose you invest \$1500 at an annual interest rate of 8.6% compounded continuously. How much will you have in the account after 20 years?

a. \$70,894.82

b. \$8,376.79

c. \$7,013.17

d. \$32,694.19

**Evaluate the logarithm.**C

14.  $\log_5 \frac{1}{25}$

a.  $5$

b.  $2$

c.  $-2$

d.  $-1$

**Write the expression as a single logarithm.**D

15.  $4 \log x - 6 \log (x + 2)$

a.  $24 \log \frac{x}{x + 2}$

c.  $\log x(x + 2)^{24}$

b.  $\log x^4(x + 2)^6$

d. none of these

Name: \_\_\_\_\_

ID: B

A

16. Solve  $3 \log 2x = 4$ . Round to the nearest ten-thousandth.

a. 10.7722

b. 5

c. 2.7826

d. 0.6309

C

17. Solve  $\frac{1}{16} = 64^{4x-3}$ .

a.  $\frac{1}{12}$

b.  $\frac{1}{4}$

c.  $\frac{7}{12}$

d.  $\frac{11}{12}$

Write the expression as a single natural logarithm.

D

18.  $3 \ln a - \frac{1}{2} (\ln b + \ln c^2)$

a.  $\ln \frac{3a}{0.5bc^2}$

b.  $\frac{3}{2} \ln \frac{a}{bc^2}$

c.  $\ln \frac{a^3}{bc}$

d.  $\ln \frac{a^3}{c\sqrt{b}}$

Use natural logarithms to solve the equation. Round to the nearest thousandth.

C

19.  $e^{2x} = 1.4$

a. -1.664

b. 0.073

c. 0.168

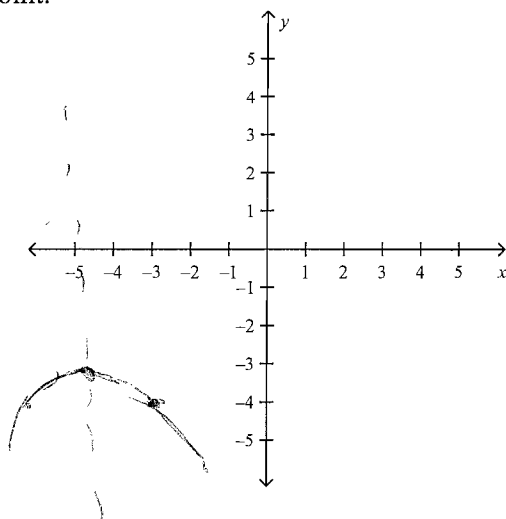
d. 0.190

### Completion

Complete each statement.

20. Graph  $y = \frac{-1}{2} (x+5)^2 - 3$

Identify the vertex,  
axis of symmetry and  
one additional point.



**Short Answer**

21. Is the relation  $\{(3, 4), (5, 4), (-3, 1), (-5, 4), (-4, 1)\}$  a function? Explain.
22. Without graphing, determine whether the function  $y = 6(0.96)^x$  represents exponential growth or exponential decay.

yes

$$b < 1$$

**Essay**

23. A model for the height of a toy rocket shot from a platform is  $y = -16x^2 + 145x + 8$ , where  $x$  is the time in seconds and  $y$  is the height in feet.
- a. Find the zeros of the function.
- b. About how high does the rocket fly before hitting the ground? Explain.

5.145s

- .05, 9.12

337 ft

**Other**

24. In a particular region of a national park, there are currently 500 deer, and the population is increasing at an annual rate of 14%.
- a. Write an exponential function to model the deer population.
- b. Explain what each value in the model represents.
- c. Predict the number of deer that will be in the region after five years. Show your work.

$$y = 500(1.14)^x$$

$$y = 963$$

#3 should be simplified by hand